



Epidemiologic Notes & Reports

Volume 35 Number 6

July 2000

FOLIC ACID AND THE PREVENTION OF NEURAL TUBE DEFECTS

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In 1992, the U.S. Public Health Service (USPHS) published the recommendation that all women of childbearing age consume 0.4 milligrams of folic acid daily to prevent the two most common and serious Neural Tube (NTD) which are:

- **Spina bifida** is a defective closure of the lower end of the bony encasement of the spinal cord, through which the spinal cord and meninges may or may not protrude. It is the most common NTD and can result in paralysis of the legs, loss of bowel and bladder control, hydrocephalus, and learning disabilities. Eighty to 90% of infants born with spina bifida survive.
- **Anencephaly** is the congenital absence of the skull, with the brain completely missing or reduced to small masses. Anencephaly accounts for approximately 25% of NTDs and is fatal. Pregnancies affected by anencephaly often result in miscarriages.

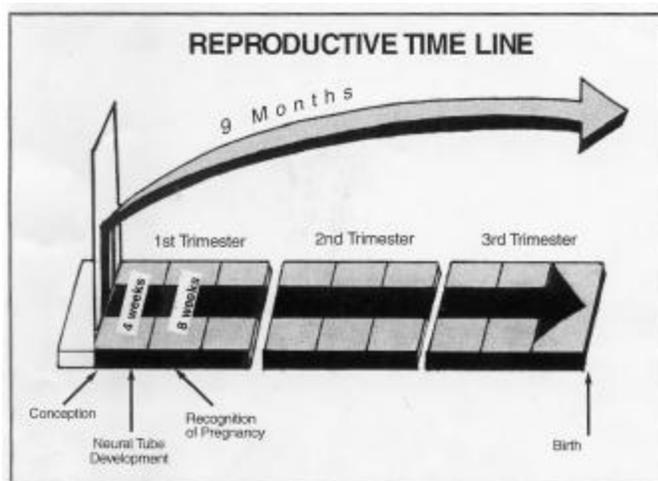
The Centers for Disease Control and Prevention (CDC) estimates that up to 70 % of these birth defects could be prevented if the folic acid recommendation was followed before and during early pregnancy.

All women of childbearing age should consume 0.4 milligrams of folic acid per day because half of U. S. pregnancies are unplanned and because NTDs occur very early in pregnancy (during the first 28 days after conception), before most women know they are pregnant (Figure 1). All women capable of becoming pregnant, not just those planning a pregnancy, should consume enough folic acid every day.

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FIGURE 1: REPRODUCTIVE TIME LINE



In recent years, health care providers have realized that folic acid is very important for everyone to maintain proper health. Studies suggest that folic acid also may help prevent heart disease and stroke. Other studies suggest that folic acid also may help prevent certain cancers, especially colon cancer. While these studies are preliminary, they suggest that the benefits from taking folic acid are widespread and affect many people.

ABOUT FOLIC ACID

Folic acid, a B vitamin, is necessary for proper cell

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growth and development of the embryo. Although it is not known exactly how folic acid works to prevent NTDs, its role in tissue formation is essential. Folic acid is required for the production of deoxyribonucleic acid, which is necessary for the rapid cell growth needed to make fetal tissues and organs early in pregnancy. It may work by correcting a deficiency or by overcoming an inherited genetic disorder of folate metabolism.

Folate and folic acid are different terms for the same B vitamin. While these two terms are often used interchangeably, there are important distinctions. Folate is the B vitamin form found naturally in foods. Folic acid is not found in natural food sources. The synthetic B vitamin, folic acid is the form used in vitamin supplements and added to fortified foods.

Most of the folate found naturally in foods has a more complex structure than the synthetic folic acid. The more complex structure affects the intestine ability to process and absorb food folate. The body can absorb and use the folic acid found in vitamin supplement and fortified foods more efficiently than it can convert the food folate into a usable form. The Institute of Medicine, National Academy of Sciences 1998 report on Dietary Intakes on Foliates estimates that the availability of synthetic folic acid is about twice that of food folate.

Effective January 1, 1998, the U.S. Food and Drug Administration ordered that all enriched cereal or grain products be fortified at a level of 0.14 milligrams of folic acid per 100 grams of grain product. While this level of fortification offers some protection against NTDs, most women will not get enough folic acid through fortified grain products alone.

In 1998, the Institute of Medicine recommended that to reduce risk for an NTD-affected pregnancy, women should consume 0.4 milligrams of synthetic folic acid daily, from fortified foods or supplements

or a combination of the two, in addition to consuming food folate from a varied diet.

WHO IS AT RISK FOR HAVING A BABY WITH AN NTD?

In the United States, approximately 4000 pregnancies a month have a NTD. It is estimated that in Kentucky 1 in 500 pregnancies a year are affected, which is twice the national average. It is not possible to predict which women will have a pregnancy effected by a NTD; 95% of women with NTD-affected pregnancies have no personal or family history of NTDs. However, some risk factors are known. These include:

- A previous NTD-affected pregnancy. This increases a woman's chance of having another NTD-affected pregnancy by approximately 20 times.
- Maternal insulin-dependent diabetes.
- Use of anti-seizure medication. (Valproic Acid/ Depakene and Carbamazepine.)
- Medically diagnosed obesity
- Exposure to high temperatures in early pregnancy (women who experience high fevers of 101.9 degrees Fahrenheit or higher lasting for at least 24 hours), use of electric blankets, and hot tubs.
- Race/ethnicity. NTDs are more common among white women than black women and more common among Hispanic women than non-Hispanic women.
- Lower socio-economic status.

INTERVENTION STUDIES SHOW REDUCTION IN RISK

Researchers began to suggest from research studies in the early 1980's that folic acid has an impact on the prevention of birth defects. In particular, three randomized controlled studies demonstrated that if women take folic acid during the peri-conceptional period, they can lower their risk of having children with NTDs. Although the mechanism for the folic acid protective effect is unknown, it is clear that a significant proportion of NTDs can be prevented.

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FOLIC ACID

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A very large recurrence study (women having a previous NTD-affected pregnancy) was reported in 1991 by the United Kingdom's Medical Research Council Vitamin Study Research Group. A group of 1817 women at risk of having an NTD-affected pregnancy was randomized to one of four vitamin use groups and 72% risk reduction was found among the group given folic acid (4 milligrams).

In 1992, a Hungarian occurrence prevention study (women not having a previous NTD-affected pregnancy) demonstrated a completely protective effect with 0.8 mg of folic acid plus multivitamins. Of 2,052 offspring of women who took a trace element supplement without folic acid, six had NTDs, as opposed to none of the 2,104 offspring of women who took a daily multivitamin containing 0.8 milligrams of folic acid.

The daily consumption of folic acid in vitamin pill form has clearly demonstrated a reduction in neural tube birth defects in a report of childbearing women in China. The project, which encouraged women to take 0.4 milligrams of folic acid a day in vitamin pill form, showed that the risk of neural tube birth defects was reduced by as much as 85 percent. The evaluation was conducted by CDC and the Beijing Medical University, China, and was published in the November 11, 1999, issue of the *New England Journal of Medicine*.

HOW MUCH FOLIC ACID IS NEEDED TO PREVENT NEURAL TUBE DEFECTS?

Women need to get enough folic acid every day throughout their reproductive years. To prevent NTDs, a woman must take folic acid daily at least one month before she conceives and continue taking it through the first trimester of pregnancy. Based on research studies:

- The USPHS and CDC recommend that all women of childbearing age consume 0.4 milligrams of folic acid every day to reduce their risk of having an NTD-affected pregnancy.

- For women who have already had an NTD-affected pregnancy, the USPHS recommends consulting with a physician about taking a much larger amount of folic acid (4 milligrams), starting one month before conception and continuing throughout the first three months of pregnancy. This dosage of folic acid must be provided through a medical prescription.

THE CHALLENGE FOR HEALTH CARE PROVIDERS

Improving infant health is a high national and state priority as reflected in objectives in *Healthy Kentuckians 2010*, aimed to reduce by half the number of babies affected by spina bifida and anencephaly. The new Governor's Early Childhood Initiative in Kentucky, KIDS NOW has recognized the impact of NTDs. In response, KIDS NOW addresses access to folic acid counseling and supplementation for low income women and supports the statewide folic acid awareness campaign for the purpose of increasing the number of women taking folic acid.

According to the 1999 Kentucky Behavioral Risk Factor Surveillance System, 40.6 % of women age 18-44 were aware women should consume 0.4 milligrams of folic acid daily for prevention of birth defects. Also, in 1999 among Kentucky women 18-44, 40.1% took a multivitamin or supplement containing folic acid daily. This information indicates an increase from 1997 in the number of women who are aware of the need to consume folic acid daily or who take a multivitamin or supplement containing folic acid daily. Even with this increase the need for extensive statewide public education and the participation by all health care providers to promote folic acid and its role in the prevention of NTDs must continue.

The Kentucky Birth Surveillance Registry (KBSR) is authorized by KRS 211.651-670 and administered through the Kentucky Department for Public Health (KDPH) to maintain information related to birth defects in Kentucky, including NTDs. Hospitals are required to report medical and demographic information for children from birth to age five diag-

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nosed with a birth defect. Through KBSR initiatives and the full participation of hospitals, physicians and other key agencies, incidence and prevalence NTDs will be assessed. This information may be used to help evaluate folic acid interventions, refine preventive strategies and link effected children and their families to needed services.

The role of health care providers in increasing the number of women taking daily folic acid can not be underestimated. A recent Canadian study demonstrated that counseling can successfully influence women's compliance with folic acid supplementation: In this study 71 % of those counseled took folic acid, compared with only 17% of those who were not counseled. Effective counseling by health professionals can play a pivotal role in helping reduce infants' risk of NTDs.

The Kentucky Folic Acid Partnership (see patient insert 1A and 1B handout), formed in December of 1998, is a consortium of more than 30 partners interested in the promotion of the folic acid message. Educational folic acid brochures, fact sheets and other promotional items may be ordered for physician offices, clinics, hospitals and other health and community settings by contacting the KDPH or Greater Kentucky Chapter of the March of Dimes.

Efforts to promote folic acid use need to be sustained and incorporated as a standard part of preventive health care services. The KDPH welcomes a greater recognition of the need for health professionals to give folic acid information to not only those actively planning pregnancy, but also to all women of childbearing age. Only with full participation by the health care community will we meet the challenge to decrease risks and improve the health of Kentucky infants.

References Upon Request



The Non-Public Health Clinical Microbiology Laboratory First Responder to Bioterrorism Workshop

TIME

October 13, 2000, 8 AM – 4 PM

LOCATION

Health Services Auditorium, 275 East Main Street,
Frankfort KY

AGENDA

- Reality of the Threat: Are we prepared as a state and as a community? KD Lane, FBI, Louisville, KY
- Planning a Medical Response to Bioterrorism. William S, Smock, MD, University of Louisville, Louisville, KY
- Clinical Syndromes Associated with likely Viological Warfare Agents. Paul McKinney, MD, University of Louisville, Louisville, KY
- Laboratory Preparedness for Bioterrorism. Meloney Russell, BSMT, Kentucky Department for Public Health, Frankfort, KY
- Laboratory Detection, Recovery, and Identification of "Targeted Agents" of Bioterrorism, James W Snyder, PhD, University of Louisville, Louisville, KY

REGISTRATION FEE

Members: \$30, Non-members: \$45

(Includes 2001 SCACM membership, breaks & lunch)

PRESENTED BY

The South Central Association for
Clinical Microbiology
and
The Kentucky Public Health Laboratory

For more information contact:

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e-mail: toverma@pop.uky.edu

OR

Chuck Johnson, (502)562-3299,
e-mail: chuk57@aol.com



MEMBERS

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March of Dimes
Spina Bifida Association of Kentucky
Barren River District Health Department
Commission for Children with Special Health Care Needs
Shriner's Hospital
Kentucky Chapter of OB-GYN
Kosair Charities Pediatric Center
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North Central District Health Department
Cumberland Valley Health District Health Department
Franklin County Health Department
Three Rivers District Health Department
Madison County Health Department
Clark County Health Department

FOLIC ACID NOW: BEFORE YOU KNOW YOU'RE PREGNANT

The first moment you look into your baby's eyes, you will probably feel both love and fear for your new responsibility. It is one of the strongest instincts of life, to protect your baby. But, you **do not** have to wait until you see your baby for the first time. You can start taking care of your baby today. **Even before you are pregnant.**



The U.S. Public Health Service recommends that all women who could become pregnant get 400 micrograms (**0.4 mg**) of folic acid every day. This could prevent up to 70% of some types of serious birth defects. But to do this, women need folic acid **a month** before they get pregnant **through the first few weeks the baby is growing.** That is why you should always get enough folic acid... **even if you are not planning a baby until next month, next year or later.**

WHY FOLIC ACID IS SO IMPORTANT?

Folic acid is a B vitamin that can be found in some enriched foods and in vitamin pills. If women have enough of it in their bodies before pregnancy, this vitamin can prevent birth defects of the baby's brain and spinal cord. **Spina bifida**, a birth defect of the spine, can cause paralysis of the lower body, with no control of bowel or bladder, and learning disabilities. Another type of birth defect effects, **Anencephaly**, effects the brain and causes babies to die within a few days.

But now the message about these birth defects is one of hope – many of them can be prevented if women get enough folic acid every day. Folic acid can help form a baby's brain and spine. Getting enough takes a small effort... **But it makes a big difference.**

EAT RIGHT...

Most of us get some folic acid in our diet every day. Folic acid has been **added** to some foods such as enriched breads, pastas, rice and cereals. Check the labels on your breakfast cereals; a few have 100% of the folic acid you need. A well – balanced diet with fruits and vegetables is always important. You can get your folic acid through food alone, but it takes careful planning to make sure you get enough every day.

...AND TAKE A VITAMIN

For many women, an easy way to be sure you are getting enough folic acid is to **take a vitamin with folic acid in it.** Almost every multivitamin you can buy has all the folic acid you need. If you get an upset stomach from multivitamins, try taking them with meals or just before bed. You can also buy vitamin pills made with only folic acid... they are small and easy to swallow.



EVEN IF YOU ARE NOT PLANNING TO HAVE A BABY YET

No one expects an unplanned pregnancy. But they happen – every day. In fact, about half of all pregnancies are not planned. That is why you should get enough folic acid every day if there is any chance you could get pregnant. **Because by the time you know you are pregnant, your baby's brain and spinal cord are already formed.**

FOR MORE INFORMATION

If you would like more information on folic acid, have questions, or concerns please contact us at:

1-888-232-6789

You can also visit the web site at:

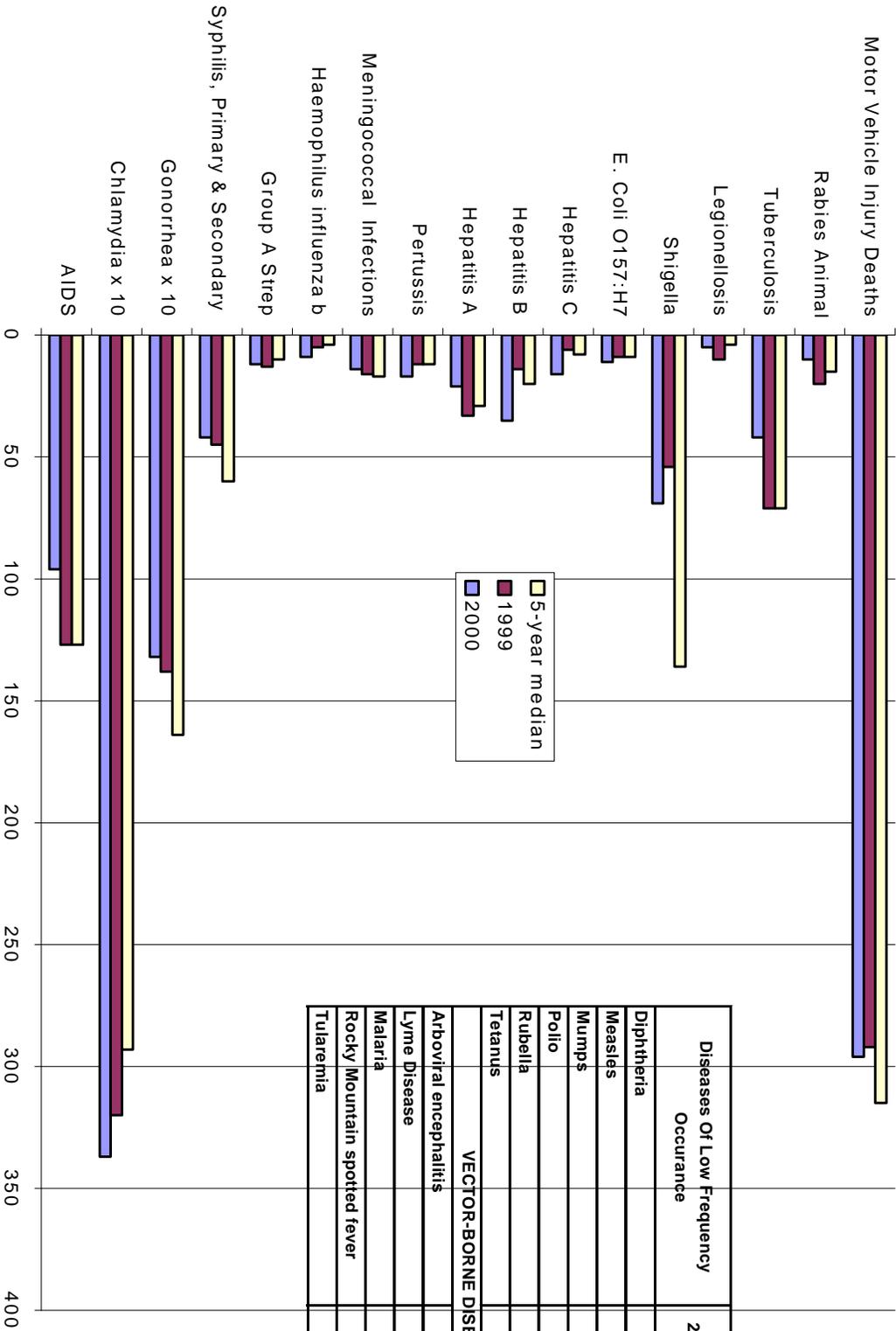
www.cid.gov/nceh/prevent/flo

Or, ask your own doctor, pharmacist, nurse, or dietitian for more information.

BUT DO NOT WAIT UNTIL YOU ARE PREGNANT...

YOUR BABY NEEDS YOU NOW-BEFORE YOU KNOW IT!!

**CASES OF SELECTED REPORTABLE DISEASES/CONDITIONS IN KENTUCKY THROUGH
MAY 2000**



Diseases Of Low Frequency Occurance	2000 YTD	1999 Annual Totals
Diphtheria	0	0
Measles	0	2
Mumps	0	0
Polio	0	0
Rubella	1	0
Tetanus	0	0
VECTOR-BORNE DISEASES		
Arboviral encephalitis	0	1 LAC
Lyme Disease	0	19
Malaria	2	7
Rocky Mountain spotted fever	0	3
Tularemia	0	3

Disease numbers reflect only those cases which meet the CDC surveillance definition.
Contributed by: Patricia Beeler, Surveillance and Health Data Branch.

KENTUCKY EPIDEMIOLOGIC NOTES & REPORTS

Printed With State Funds

by the

COMMONWEALTH OF KENTUCKY
CABINET FOR HEALTH SERVICES
DEPARTMENT FOR PUBLIC HEALTH
275 EAST MAIN STREET
FRANKFORT, KENTUCKY 40621



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You can reach the site from any computer with Internet access at the following address:

<http://publichealth.state.ky.us>

Any web viewing problems, issues, or questions should go to:
Nancy Massie at (502) 564-9317) or e-mail: nancy.massie@mail.state.ky.us

ALSO:

KENTUCKY VITAL STATISTICS BIRTH, DEATH, MARRIAGE/DIVORCE CERTIFICATES

Are now available ONLINE AND BY FAX from any computer with Internet access at the following address:

<http://www.vitalchek.com/displayprovider.asp?provider=2854>

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